

Remarks

Claims 1-11 are pending. Claims 1-11 stand rejected. Claim 1 is amended by this response. Applicants respectfully traverse the rejection and request allowance of claims 1-11.

The Examiner rejected claims 1-7 and 10-11 under 35 U.S.C. § 103 over U.S. Patent 5,663,509 (Lew) in view of U.S. Patent 5,394,758 (Wenger). The Examiner rejected claims 8-9 in further view of U.S. Patent 6,044,715 (Ollila). The Applicants submit that amended claim 1 is novel and non-obvious over these references. Amended claim 1 describes a first flow tube that forms substantially a semicircle. The semicircle of the first flow tube begins at the inlet end and ends at the outlet end. Therefore, the entire shape of the first flow tube substantially comprises a semicircle. Amended claim 1 also describes a second flow tube that forms the same semicircular shape.

The Applicants submit that amended claim 1 is novel over Lew. Lew teaches flow meters of various shapes, and none of the flow meters in Lew teaches a flow tube forming a semicircle as described in amended claim 1. For example, FIG. 5 in Lew shows a flow meter with two flow tubes (44, 45). The following describes the shape of the flow tubes from an inlet end to an outlet end: a straight portion including the inlet end that is positioned to receive a flow of material from a pipeline, three curved portions that form a U-shape, and another straight portion including the outlet end that is positioned to transfer the flow of material to the pipeline. The three portions are contiguous to form a horse-shoe shape having straight portions and multiple curved portions. The middle portion of the flow tube in Lew does have a semicircular arc, but in no way does Lew teach that the entire shape of the flow tubes comprise a semicircle. Therefore, Lew cannot teach a first flow tube forming substantially a semicircle that begins at an inlet end and ends at an outlet end, or a second flow tube forming substantially a semicircle that begins at an inlet end and ends at an outlet end as claimed in amended claim 1. Thus, claim 1 is novel and non-obvious over Lew.

On page 7 of the office action, the Examiner states that the flow tube in Lew is largely but not wholly semicircular. The Applicants disagree. A semicircle has a particular shape that is known in geometry. A slight deviation from that known shape is “substantially” a semicircle. The shape of the flow tube in Lew is not merely a slight deviation from a semicircle. The flow tube in Lew has a straight

portion, a bend, a semicircular arc, another bend, and another straight portion. The semicircular arc is only a small portion of the total shape and length of the flow tube in Lew. The semicircular arc comprises about one-third of the total length of the flow tube (see FIG. 5). If one-third of the flow tube is semicircular and the remaining two-thirds of the flow tube is not, is that "largely but not wholly" semicircular as suggested by the Examiner? Looking at FIG. 5 in Lew, although a portion of the flow tube has a semicircular shape, how can one argue that the entire length of the flow tube largely but not wholly comprises a semicircle?

Amended claim 1 is also novel over Wenger. Wenger teaches a flow meter (1) comprised of flanges (19, 20), flow tubes (11, 12), brace bars (32, 33), a driver (16), and pickoffs (17, 18) (FIGS. 1-2; column 3, line 58 thru column 5, line 17). The flow tubes are loops that have straight portions (111, 112) and a curved portion (FIGS. 1-2; column 3, line 66 thru column 4, line 12). A flow tube with a straight portion, such as in Wenger, cannot form a semicircle that begins at an inlet end and ends at an outlet end as described in amended claim 1. Thus, claim 1 is novel and non-obvious over Wenger.

Because neither Lew nor Wenger teaches the shape of the first flow tube and the second flow tube as claimed in amended claim 1, amended claim 1 is novel and non-obvious over Lew, Wenger, and any combination thereof. Claims 2-11 are allowable as being dependent on claim 1. Claims 8-9 are new and novel over Ollila for the reasons discussed above. The Applicants submit that there may be additional reasons in support of patentability, but that such reasons are moot in light of the above remarks and are omitted in the interests of brevity. The Applicants respectfully request allowance of claims 1-11.

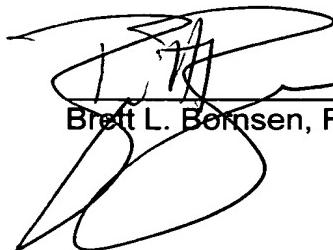
Any fees in addition to the fees submitted may be charged to deposit account 03-1725.

Respectfully submitted,

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Version with Markings to Show Changes Made

In the Claims

The following represent marked-up versions of the amendments made to the claims. All of the claims are presented, amended or not, in order to avoid confusion in the event of future prosecution.

1. (Thrice Amended) A Coriolis flowmeter having a reduced flag dimension comprising:

a first flow tube having an inlet end and an outlet end, said first flow tube forming substantially a semicircle [between] that begins at said inlet end of said first flow tube and ends at said outlet end of said first flow tube;

a second flow tube having an inlet end and an outlet end, said second flow tube forming substantially a semicircle [between] that begins at said inlet end of said second flow tube and ends at said outlet end of said second flow tube;

a driver affixed to said first flow tube at a point on said first flow tube that is substantially perpendicular to a bending axis of said first flow tube, said driver also affixed to said second flow tube at a point on said second flow tube that is substantially perpendicular to a bending axis of said second flow tube, wherein said driver oscillates said first flow tube and said second flow tube in opposition to each other;

a first brace bar affixed to said first flow tube proximate said inlet end of said first flow tube and affixed to said second flow tube proximate said inlet end of said second flow tube;

a second brace bar affixed to said first flow tube proximate said outlet end of said first flow tube and affixed to said second flow tube proximate said outlet end of said second flow tube; and

pick-offs affixed to said first flow tube and said second flow tube in a position that allows said pick-offs to detect a desired amount of Coriolis force at a low amplitude vibration.

2. (Amended) The Coriolis flowmeter of claim 1 further comprising:

an inlet manifold affixed to said inlet end of said first flow tube and said inlet

end of said second flow tube to affix said first flow tube and said second flow tube to a pipeline.

3. (Unchanged) The Coriolis flowmeter of claim 2 further comprising:
a substantially 90 degree bend in a flow path through said inlet manifold.

4. (Amended) The Coriolis flowmeter of claim 1 further comprising:
an outlet manifold affixed to said outlet end of said first flow tube and said outlet end of said second flow tube to connect said first flow tube and said second flow tube to a pipeline.

5. (Unchanged) The Coriolis flowmeter of claim 4 further comprising:
a substantially 90 degree bend in a flow path though said outlet manifold.

6. (Amended) The Coriolis flowmeter of claim 1 further comprising:
an inlet manifold affixed to said inlet end of said first flow tube and said inlet end of said second flow tube to affix said first flow tube and said second flow tube to a pipeline;
an outlet manifold affixed to said outlet end of said first flow tube and said outlet end of said second flow tube to connect said first flow tube and said second flow tube to said pipeline; and
a spacer affixed to said inlet manifold and said outlet manifold to maintain a fixed distance between said inlet manifold and said outlet manifold.

7. (Amended) The Coriolis flowmeter of claim 6 wherein said spacer comprises:

an inlet end affixed to said inlet manifold;
an outlet end affixed to said outlet manifold;
a top side, a bottom side, a front side, and a back side each extending between said inlet end of said spacer and said outlet end of said spacer to form a rectangular body; and
openings through said top side of said spacer through which said first flow tube and said second flow tube are affixed to said inlet manifold and said outlet manifold.

8. (Unchanged) The Coriolis flowmeter of claim 7 further comprising:
a casing that encloses said first flow tube and said second flow tube affixed
to said top side of said spacer.

9. (Amended) The Coriolis flowmeter of claim 8 wherein said casing
comprises:

a front side wall;
a back side wall; and
a mass affixed to said front side wall and said back side wall to change
vibrational modes of said casing.

10. (Amended) The Coriolis flowmeter of claim 1 wherein said position of
said pick-offs is substantially 25-50 degrees from said bending axis of said first flow
tube and said bending axis of said second flow tube.

11. (Amended) The Coriolis flowmeter of claim 10 wherein said position of
said pick-offs is 30 degrees from said bending axis of said first flow tube and said
bending axis of said second flow tube.